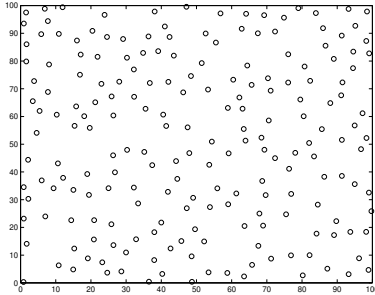


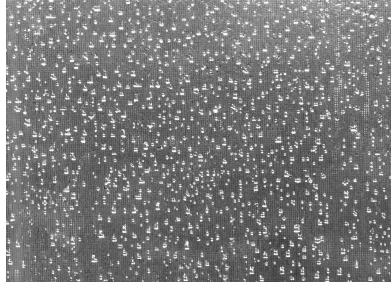
STS 533, Stochastic Systems

Instructor: David Hiebeler (david.hiebeler@maine.edu)

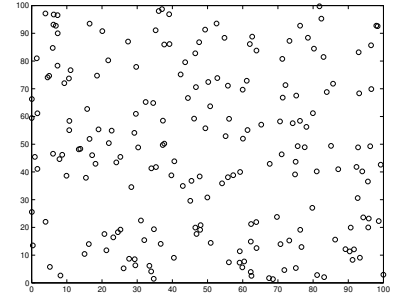
MWF 10:00-10:50am, Spring 2023



Overdispersed points



Raindrops on a window screen



Independent random points

Course description: Deterministic mathematical models have proven enormously useful in a vast array of fields. However, the real world is often a messy, noisy, seemingly random place. Formally, a stochastic process is a collection of random variables, $\{X(t), t \in T\}$ indexed by a variable often thought of as time. Stochastic processes can be used to add randomness to existing/underlying deterministic models such as ecological and epidemiological models, or to build entirely new models that are inherently random from the start. This course will review some concepts from probability such as conditional probability and conditional expectations, followed by topics including discrete- and continuous-time Markov chains, random walks, Poisson processes (in time, and in space as in the images above) and the exponential distribution, and branching processes.

Prerequisites: A grade of C or better in STS 434.

Textbook: *Introduction to Probability Models, 11th edition*, by Sheldon Ross. Possibly supplemented by *Adventures in Stochastic Processes*, by Sidney Resnick, and *Introduction to Stochastic Processes*, by Hoel, Port, and Stone.